



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

PLAGUE.

ITS GEOGRAPHIC DISTRIBUTION AND ITS MENACE TO THE UNITED STATES.¹

By W. C. RUCKER, Assistant Surgeon General, United States Public Health Service.

Bubonic plague follows the main traveled roads, spreading out along the less beaten paths to the remote ends of the earth. Fortunately, its spread from one country to another occurs more frequently by water than by land.

The United States Hydrographic Office issues a large map called "Tracks for Full Powered Steam Vessels." It is a Mercator's projection of the world. If such a map be laid out on a flat surface and pins are inserted to mark the places in which bubonic plague prevails at the present time, not only will the geographic distribution of the disease be pictorially represented, but the fact of its spread along the routes of commerce will be shown as well. It will be noted in the first place that the continents are almost encircled by the pins which mark the places where plague exists, and at those points where the lines of travel converge, such as the Hawaiian Islands and Mauritius, the disease is almost sure to exist.

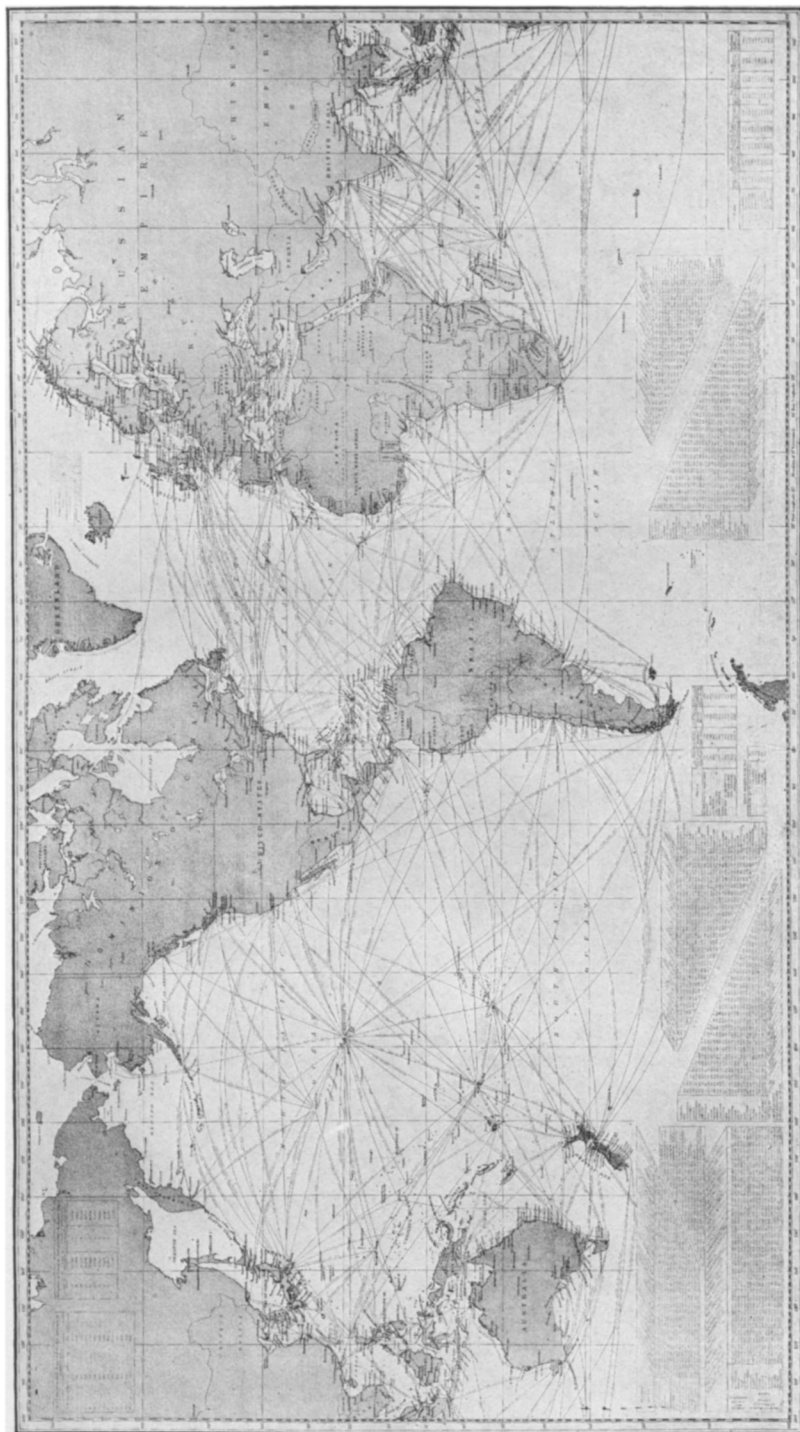
Rodent and human plague were found in the Hawaiian Islands no longer ago than August last. Taking the Hawaiian Islands as a central point, plague is found to exist in Seattle, 2,409 miles away; in California, 2,091 miles distant; in Yokohama, 3,445 miles away; in Hongkong, 4,857 miles away, and in Shanghai, a little over 5,000 miles distant. It is thus easily seen how our entire Pacific coast is threatened by plague from the Orient, with the Hawaiian Islands as the point at which the lines of travel converge and from which the disease routes spread out to our western ports.

The Pacific coast is also menaced by the existence of the disease in Ecuador and Peru, on the western coast of South America, a little over 4,000 miles away from San Francisco.

The entire Gulf coast of our country is menaced by plague in Habana, 769 miles from Galveston, 601 miles from New Orleans, 324 miles from Tampa, and 92 miles from Key West. The disease was found among rats in New Orleans no longer ago than March 9, 1915. On account of the unsettled conditions now existing in Mexico, it is impossible to know whether or not plague exists in her Gulf ports.

The Atlantic coast of the United States is threatened with the importation of plague not only from the eastern coast of South America but from European, African, and Asiatic ports as well. Less than 5,000 miles from New York, plague is found in Brazil, at Pernambuco, Bahia, and Rio de Janeiro. In the Mediterranean littoral, plague is found in Tripoli, Greece, Egypt, and at Port Said, one of the great gateways of the world. Practically all of the great ports of British

¹ Read before the State Medical Association of Texas, Fort Worth, Tex., May 4, 1915.



MAP SHOWING TRACKS OF FULL-POWERED STEAM VESSELS.

India, with the exception of Calcutta, are infected with plague. Rangoon, Madras, Colombo, Bombay, and Karachi report the presence of the disease, and from the latter point it has extended up into the Persian Gulf. Singapore, Surabaya, Mauritius, Zanzibar, Queens-town in South Africa, and Dakar in Senegal, all have plague. Directly or indirectly our country is in commercial communication with all of the infected places which have been mentioned, and it must be admitted that in view of the fact that plague is a disease of rodents which travel around the world in ships, the United States must consider itself as seriously menaced by bubonic plague.

Under normal conditions plague is an epizootic disease of rodents. Occasionally, as favorable conditions arise, it becomes an epidemic disease. Among rodents it may be either acute or chronic. The former condition produces a rapid local spread of the epizootic. The latter condition perpetuates it locally and permits its distribution to distant ports. Since the disease is capable of such perpetuation and since it is found in almost all of the great ports of the world, there is no reason to believe that it does not exist in the remaining ports, and that our lack of knowledge as to its existence in those ports from which it has not been reported, means that the search for the disease has either been neglected or has been made half-heartedly. This applies to the United States as well as to other countries. Careful rodent surveys have been conducted in only three of the ports of this country and in all three of these the disease has been found to exist. It is not at all unlikely that a thorough search would demonstrate the presence of the disease in the other American seaports having a large foreign commerce.

The experience at New Orleans is an ample demonstration of this assertion. Several thousand rats were examined before a single one was found which was plague infected, and this one would in all probability have been entirely overlooked had it not been for the large experience of the examiners. The examination of rats is a matter requiring considerable skill and much experience, and whenever there is a plague outbreak as many sanitary officers as possible should visit the scene and thoroughly familiarize themselves with the methods to be used in diagnosing, studying, and combating the disease. This was done at New Orleans, and representatives from many of the States found there an excellent opportunity to acquire knowledge of the disease at first hand.

Granted the existence of such a condition, What are the steps to be taken to combat it? The first line of defense is maritime quarantine. This may be so applied as to be exceedingly effective, but such efficiency is to be obtained only at the price of disastrous interference with commerce. The routine disinfection of ships, if done very thoroughly, will prevent the introduction of rats, and therefore the introduction of bubonic plague, but such a measure is of temporary

value only, and if omitted a single time may be followed by the introduction of plague rats. In the case of vessels hailing from known plague ports such fumigation should not be omitted, and in the protection of ports which have not been rat proofed it is also necessary. To sum up, quarantine is absolutely effective only at the cost of commerce. It is at best a makeshift. Disinfection is expensive and not always certain.

The second line of defense is at the wharves and consists in the prevention of the embarkation or disembarkation of rodents. This is accomplished by the use of metal rat guards on all mooring lines; by breasting the vessel off from the wharf by rafts or spars; by the guarding of gang planks; and by the inspection of the freight to determine its rat-proof, rat-free condition prior to loading or unloading. The last is a valuable measure, but not one upon which absolute reliance can be placed.

The third line of defense may consist in the immunization of human beings against bubonic plague. This is at best a weak reed upon which to lean. In the absence of an epidemic it is manifestly impossible in American cities to enforce Haffkinization. Under the most favorable conditions only a small portion of the community would consent to voluntary immunization, and of those who took the treatment only a small proportion would be among the stevedore and water-front class, the very people who are most liable to the disease at the beginning of the epidemic.

The fourth line of defense consists in rat proofing the environment in which man works and lives. All of the other lines of defense or any combination of them may be used, but the single one upon which absolute reliance can be placed and from which lasting protection may be obtained is by the insulation of man from the animal which serves as the disseminating host of bubonic plague. Any city which will render itself completely rat proof need have no fear whatsoever of plague. The introduction of plague rats into such a place will be an occurrence of no account, because if rats and therefore the insects which they harbor are excluded from close contact with man it is a matter of entire indifference to him whether the rats have plague or not. It is not infrequently urged that rat proofing is expensive. In the final analysis this is not true, and by reason of the more rapid and increased commercial communication which we have with all the rest of the world rat proofing has become as absolutely necessary as are good roads, sewers, and public water supplies.

No modern city can afford to regard rat proofing as a luxury. It is the duty of every municipality to incorporate in its public-health and building codes ordinances requiring the rat proofing of all structures within the limits of its jurisdiction. If the passage of such legislation is put off until an epidemic has appeared the work must be done under pressure. It is then relatively expensive. If the

work is done gradually, particularly if it is done at the time the building is erected, the cost is comparatively trifling.

The only kind of rat proofing which is really worth while is by the use of permanent impervious material, such as brick, concrete, or stone. This will fortify the ground areas against the entrance of the Norway rat. In the installation of such rat proofing great care is necessary that all accidental openings, such as are found around plumbing, electric wiring, and the like, be closed effectively. All openings above the ground area should be closed with metal screening so that the climbing rats may not enter in this way. Those who live or work in rat-proof premises need have no fear of plague, and the city which is rat proof will not become the scene of an epidemic of the disease.

The eradication of plague from the city of New Orleans has already cost the Nation, the State, and the municipality upward of \$400,000, exclusive of the large sums of money which corporations and private individuals have laid out in rat proofing. The \$400,000 expended for epidemic measures would have gone a long way toward building permanent fortifications against rats. In addition, it should be pointed out that the business losses which the presence of an epidemic produces are so great as to be almost beyond computation.

So much has been written and said-elsewhere regarding the methods to be used in plague eradication and prevention that it is needless to review that phase of the subject here. We know that plague is widely distributed over the inhabited portions of the globe. We know that our country is in constant communication with the various foci of the disease. We know that the most perfect quarantine system which it is capable for the mind of man to devise can not absolutely exclude the disease without serious impairment of commerce. We know that by the foresighted application of the simple principles which have been worked out by Surg. Gen. Rupert Blue and his coworkers plague may be eradicated or prevented. The remedy, then, is simple. It lies in our power to say whether or not our country shall suffer sorrow and bereavement and financial losses by reason of our failure to make use of well-proven measures. The day is fast approaching when the spread of this knowledge will have been such that public opinion will brand as ignorant or careless, communities which fail to erect those barriers which will banish rodents from the home of man. In the older countries it is more difficult by reason of structural conditions to put plague-preventive measures into operation, but in a new country like ours, which is still in the era of building, the erection and maintenance of nonrat-proof structures is inexcusable. Our duty as the wardens of the public health is to disseminate the information that plague is a wholly and entirely preventable disease, having no place in modern civilization and enlightened communities.